REMARKS

Applicant respectfully requests the Examiner to reconsider the present application in view of the foregoing amendments to the claims.

Status of the Claims

In the present Reply, claims 12 and 13 have been added. Also, claim 2 was previously canceled without prejudice or disclaimer of the subject matter contained therein. Further, claims 8-11 have been withdrawn from consideration. Thus, claims 1 and 3-13 are pending in the present application.

No new matter has been added by way of new 12-13 claims because each new claim is supported by the present specification. For example, support for these new claims can be found at page 8, lines 3-10 and the paragraph bridging pages 8-9 of the present specification (see also the Examples).

Based upon the above considerations, entry of the present amendments is respectfully requested.

In view of the following remarks, Applicant respectfully requests that the Examiner withdraw all new rejections and allow the currently pending claims.

Issues Under 35 U.S.C. § 112, Second Paragraph

Claims 1 and 3-7 stand rejected under 35 U.S.C. § 112, second paragraph, as stated on pages 3-4 of the Office Action. Applicant respectfully traverses and requests reconsideration based on the following.

In the Office Action, the Examiner questions how the "antibacterial substance" is different from the "pectin substance." In response, Applicant respectfully submits that the "antibacterial substance" is not the same as the "pectin substance" (e.g., they are different). The present inventor has discovered that reacting a plant with an enzyme (which acts on protopectin to release the pectin substance) leads to liberation of the antibacterial substance from middle lamellae of the plant tissue (see also page 3, lines 15-22 of the present specification). This antibacterial substance inhibits germination of spores from spore-forming bacteria. Thus, since the two substances are not the same, no amendment has been made to claim 1.

In addition, Applicant respectfully submits that claim language must be read in light of the specification as it would be interpreted by one of ordinary skill in the art. *In re Johnson and Farnham*, 194 USPQ 187, 194 (CCPA 1977). In this regard, the above statements are also mentioned in Applicant's specification at, e.g., page 5, line 24 to page 6, line 5. Also, as described on page 3, lines 9-12 of the present specification, when protopectinases act on plant tissue, plant cells are isolated into single cells which releases pectin substances. These pectin substances connect the plant cells in plant tissue (thereby the pectin substances are released when the plant cells are isolated into single cells).

Applicants also enclose the various technical definitions of the term "pectin": (1) *Dictionary of Microbiology and Molecular Biology*, pp. 643-644 (Second Ed.); (2) *Dorland's Illustrated medical Dictionary*, p. 1150 (Twenty-fifth Ed.); (3) *The Merck Index*, p. 7135 (Thirteenth Ed. 2001); and (4) *The Condensed Chemical Dictionary*, pp. 661-662 (Eighth Ed.). These definitions, as one of skill in the art would also understand, clearly show that a "pectin substance" and an "antibacterial substance" are different. Applicants additionally note that none of the enclosed technical dictionary definitions even describe that pectins can inhibit germination of spores from spore-forming bacteria and koji mold. Rather, pectins are known to be used as gelling agents for food or drugs (see, e.g., the definition of "pectin" in the *Dictionary of Microbiology and Molecular Biology*) and are not considered an antibacterial substance.

Accordingly, the disputed claims are clear and definite to one of skill in the art. Reconsideration and withdrawal of this rejection are respectfully requested.

Issues Under 35 U.S.C. §§ 102(b)/103(a)

Claims 1 and 3-7 stand rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Sakai '262 (U.S. Patent No. 4,835,262) (see pages 4-8 of the Office Action). Applicant respectfully requests reconsideration and withdrawal of these rejections based on the following.

In the Office Action, the Examiner refers Applicant to various parts of Sakai '262 as reading upon the instant claims. For example, Sakai '262 appears to disclose a method of obtaining a pectin substance from plant tissue by using enzymes such as protopectin (see, e.g.,

column 3, lines 30-36 and 59-63; column 4, lines 12-22; Example 1 at column 4, line 34). Also, the Examiner refers to how "polysaccharides are well known in the art for their industrial use as medicines such as antibiotics which have antibacterial activity" (see page 6, lines 12-14 of the Office Action). Further, reference is made to how Sakai '262 discusses a pectin substance and can be used as a medicine (see page 5, first paragraph of the Office Action). Thus, at pages 6-7 of the Office Action, the Examiner essentially states that the pectin substance as disclosed in Sakai '262 would have at least been expected to provide successful results as an antibacterial substance like the present invention. Applicant respectfully traverses.

Applicants again respectfully refer the Examiner to the attached various technical definitions of the term "pectin" from (1) *Dictionary of Microbiology and Molecular Biology*; (2) *Dorland's Illustrated medical Dictionary*; (3) *The Merck Index*; and (4) *The Condensed Chemical Dictionary*. As can be seen from the attachments, none of enclosed technical dictionary definitions even describe that pectins can inhibit germination of spores from spore-forming bacteria and koji mold. Rather, pectins are known to be used as gelling agents for food or drugs/pharmaceuticals and Sakai '262 at column 3, lines 51-52 even refers to this type of usage of pectin (food or medicine). The pectin substance is not the same as an antibacterial substance.

Thus, Sakai '262 fails to disclose all instantly claimed features, which includes the instantly claimed antibacterial substance (wherein this substance inhibits spore formation from spore-forming bacteria and koji mold). Though the Examiner refers to how Sakai '262 discusses a pectin substance and can be used as a medicine, Applicant respectfully submits that this

assertion does not apply to what is instantly claimed (e.g., the antibacterial substance). Because "a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference," the cited Sakai '262 reference cannot be a basis for a rejection under § 102(b). *See Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Thus, because of the lack of disclosure of all features as instantly claimed, the rejection in view of Sakai '262 is overcome. Reconsideration and withdrawal of the anticipatory rejection are respectfully requested.

Applicant also respectfully submits that a *prima facie* case of obviousness has not been established since U.S. case law squarely holds that a proper obviousness inquiry requires consideration of three factors: (1) the prior art reference (or references when combined) must teach or suggest all the claim limitations; (2) whether or not the prior art would have taught, motivated, or suggested to those of ordinary skill in the art that they should make the claimed invention (or practice the invention in case of a claimed method or process); and (3) whether the prior art establishes that in making the claimed invention (or practicing the invention in case of a claimed method or process), there would have been a reasonable expectation of success. *See In re Vaeck*, 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991); *see also In re Kotzab*, 55 USPQ2d 1313, 1316-17 (Fed. Cir. 2000). Here, not even the initial requirement of disclosure of all claimed features has been satisfied (e.g., the instantly claimed antibacterial substance). Thus, this § 103(a) rejection is improper, and Applicant respectfully requests withdrawal of the rejection.

Applicant also respectfully submits that the requisite reasonable expectation of success is missing. *In re Vaeck.* Though the Examiner refers to how Sakai '262 describes pectin not being contaminated with chemical substances (see the Office Action at page 6, second paragraph), Applicant respectfully note that column 3, lines 37-55 of Sakai '262 refers to an isolation step. After this described isolation step, the Sakai '262 pectin substance does not contain contaminating chemical substances. Accordingly, Applicant respectfully traverses the conclusions in the Office Action regarding how the Sakai '262 substance equates to what is instantly claimed since the present invention uses an antibacterial substance to inhibit spore formation, and Sakai '262 requires purification for its pectin substance to work (which is not the same as the antibacterial substance anyway).

Regarding the asserted well known use of polysaccharides in general as medicines as stated at page 6, the second paragraph of the Office Action, Applicant respectfully traverses and requests that the Examiner produce technical evidence to support this assertion.

Based on the above, Applicant respectfully traverses the conclusions in the Office Action pertaining to how it would have at least been expected to provide successful results as an antibacterial substance like the present invention. As explained above, the present inventor has discovered that reacting a plant with an enzyme (which acts on protopectin to release the pectin substance) leads to liberation of an antibacterial substance from the middle lamellae of plant tissue. Further, the present invention uses this antibacterial substance to inhibit undesirable spore germination. Sakai '262 fails to disclose or teach such features and advantages of the present invention.

Accordingly, Applicant respectfully submits that all rejections have been overcome. First, Sakai '262 fails to disclose all instantly claimed features and therefore the rejection under 35 U.S.C. § 102(b) has been overcome. Second, Applicant respectfully submits that a *prima facie* case of obviousness has not been established since, again, there is no disclosure of all claimed features in the Sakai '262 reference. Thus, this rejection under § 103(a) has also been overcome. Therefore, reconsideration and withdrawal of these rejections are respectfully requested.

Conclusion

A full and complete response has been made to all issues as cited in the Office Action. Applicant has taken substantial steps in efforts to advance prosecution of the present application. Thus, Applicant respectfully requests that a timely Notice of Allowance issue for the present case.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Eugene T. Perez (Reg. No. 48,501) at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Dated: July 21, 2006

Respectfully submitted,

By _____

Marc S. Weiner
Registration No.: 32,181
BIRCH, STEWART, KOLASCH & BIRCH, LLP
8110 Gatehouse Road, Suite 100 East
P.O. Box 747
Falls Church, Virginia 22040-0747
(703) 205-8000
Attorney for Applicant

Attachments: *Dictionary of Microbiology and Molecular Biology*, pp. 643-644 (Second Ed.)
Dorland's Illustrated medical Dictionary, p. 1150 (Twenty-fifth Ed.)
The Merck Index, p. 7135 (Thirteenth Ed. 2001)
The Condensed Chemical Dictionary, pp. 661-662 (Eighth Ed.)

DICTIONARY OF MICROBIOLOGY and MOLECULAR BIOLOGY

Second Edition

Paul Singleton
Diana Sainsbury

A Wiley–Interscience Publication

JOHN WILEY & SONS
Singapore · New York · Brisbane · Toronto · Chichester

pectase See PECTIC ENZYMES.

pectates Salts of pectic acid — see PECTINS.

pectic acid See PECTINS.

pectic enzymes ('pectinases') Enzymes which degrade PECTINS; they are widely distributed among microorganisms. There are two broad categories of pectic enzyme: those which de-esterify pectins (pectinesterases) and those which degrade the galacturonan backbone chain (depolymerases).

Pectinesterase (pectin methylesterase, pectase, pectin pectyl-hydrolase, EC 3.1.1.11) de-esterifies pectins, producing methanol and pectic acid; pectinesterases occur in higher plants, numerous fungi (including some yeasts) and some bacteria.

Pectic depolymerases include both hydrolases, which hydrolyse glycosidic linkages in the galacturonan, and lyases, which cleave a glycosidic bond with the formation of a double bond between C-4 and C-5 in the residue at the newly formed non-reducing end (β-elimination). These enzymes vary in their specificities; most function mainly or only on non-esterified galacturonans (pectic acids). Depolymerases which act as endoenzymes include e.g. *endopolygalacturonase* (poly-(1→4)-α-D-galacturonide glycanhydrolase, EC 3.2.1.15), produced by many plant-pathogenic and saprotrophic fungi and bacteria and by some yeasts; *endopectate lyase* (polygalacturonic acid *trans*-eliminase, endopolygalacturonate lyase, EC 4.2.2.2), produced by various bacteria — especially SOFT ROT (2) agents — and some plant-pathogenic fungi; and *endopectin lyase* (pectin lyase, polymethoxylgalacturonide lyase, EC 4.2.2.10 — the only depolymerase specific for highly esterified pectins), produced mainly by fungi. Exoenzymes include *exopolygalacturonase* (poly(1→4)-α-D-galacturonide galacturonohydrolase, EC 3.2.1.67), produced e.g. by plants, fungi and some bacteria; and *exopectate lyase* (EC 4.2.2.9 — an enzyme which liberates unsaturated dimers or, less commonly, trimers [e.g. JGM (1982) *128* 2661–2665] from the reducing end of a pectic acid), produced e.g. by certain bacteria.

Pectinolytic organisms can be important plant pathogens and causal agents of spoilage of fresh and preserved fruit and vegetables (see e.g. SOFT ROT (2); PICKLING; CANNING). Many plants have cell wall-associated proteins which act as inhibitors of endopolygalacturonases in vitro; these proteins are thought to serve a defensive role against invasion by pectinolytic pathogens, although it has been reported that they may not be effective in vivo [PP (1985) *34* 54–60]. (See also TANNINS.) Pectinolytic organisms also fulfil useful roles: see e.g. COFFEE; RETTING; RUMEN. Preparations of pectic enzymes, obtained mainly from *Aspergillus niger*, are used e.g. to facilitate pressing in the extraction of fruit juices, to clarify (reduce turbidity and viscosity of) fruit juices, etc. (See also ENZYMES.)

[Book ref. 31, pp. 227–282; review: JAB (1980) *48* 1–45.]

pectic polysaccharides (pectic substances) Polysaccharides obtained from isolated plant cell walls by extraction with boiling water (with or without EDTA) or dilute acid (cf. HEMICELLULOSES); they generally include PECTINS, pectic acid and its salts (pectates), and certain neutral polysaccharides (e.g. arabinogalactans) which occur in association with pectins.

pectic substances *Syn.* PECTIC POLYSACCHARIDES.

pectin See PECTINS.

pectin methylesterase See PECTIC ENZYMES.

pectinases See PECTIC ENZYMES.

pectinate (1) (adj.) Arranged like the teeth of a comb. (2) (noun) A salt of 'PECTINIC ACID'.

Pectinatus A genus of Gram-negative bacteria (family BACTEROIDACEAE) which have been isolated from spoilt beers. Cells: round-ended, slightly curved or helical rods or filaments, 0.7–0.8 × 2.0–32.0 μm; lateral flagella arise in a line along the concave side of the cell. Acid is formed from the fermentation of e.g. arabinose, fructose, glucose, glycerol, lactate, maltose and mannitol; lactate fermentation yields acetic, propionic and succinic acids, and CO_2, as major products. GC%: ca. 40. Type (only) species: *P. cerevisiiphilus*.

pectinella One of the circumferential bands of cilia which encircle some ciliates (e.g. *Didinium*). (cf. TROCHAL BAND.)

pectinesterases See PECTIC ENZYMES.

pectinic acid An outmoded term for colloidal galacturonans which have a methyl ester content intermediate between that of PECTINS and pectic acids.

pectinolytic (pectolytic) Able to degrade PECTINS — see PECTIC ENZYMES.

pectins The major component of the PECTIC POLYSACCHARIDES. Pectins consist essentially of (1→4)-α-D-linked galacturonic acid residues (= pectic acid); a variable number of the C-6 carboxyl groups are methyl-esterified, and, commonly, α-L-rhamnose residues occur at intervals within the chain (forming a rhamnogalacturonan). Other neutral sugars (e.g. L-arabinose, D-galactose) may occur in (usually short) side-chains. Pectins occur in the primary cell walls and intercellular regions of plants (many fruits have a high pectin content); they also occur in the cell walls of certain algae.

Pectins are powerful gelling agents and are widely used in the food industry (e.g. as a setting agent in jams) and in pharmaceuticals and cosmetics. Pectin-degrading enzymes

(PECTIC ENZYMES) are produced by a wide range of microorganisms but not by higher animals or by man. (See also RUMEN.)

Pectobacterium See ERWINIA (Carotovora group).

pectolytic *Syn.* PECTINOLYTIC.

Pediastrum A genus of freshwater colonial green algae (division CHLOROPHYTA). Each colony is flat and disc-like (up to ca. 100 μm diam.) and is typically made up of a central cell surrounded by concentric rings of cells; the outermost cells each have two lobes projecting radially outwards, so that the colony resembles a miniature gear-wheel.

pedicel A small stalk. In the fruiting bodies of some myxobacteria: a branch of the common (main) stalk bearing a single sporangium.

Pedinomonas See MICROMONADOPHYCEAE.

Pediococcus A genus of Gram-positive bacteria of the family Streptococcaceae. Cells: non-motile cocci (ca. 1 μm diam.), commonly in pairs and tetrads. Certain vitamins and amino acids are essential for growth. Growth occurs optimally under microaerobic conditions; glucose is fermented homofermentatively and anaerogenically to DL-lactic acid, L(+)-lactic acid generally predominating. (See also LACTIC ACID FERMENTATION.)

The nomenclature of the species of *Pediococcus* is at present confused [for discussion see Book ref. 143, pp. 179–211]. Some authors have recognized the following species as validly published: *P. acidilactici, P. damnosus* (formerly *P. cerevisiae*), *P. dextrinicus, P. halophilus, P. parvulus* and *P. pentosaceus*. (See also BEER SPOILAGE; IDLI; LACTIC ACID BACTERIA; MALOLACTIC FERMENTATION; MISO; PICKLING; SOY SAUCE.)

pedology Soil science.

Pedomicrobium A genus of budding PROSTHECATE BACTERIA found e.g. in soils; the life cycle is similar to that of HYPHOMICROBIUM but differs e.g. in that the mother cell may have many prosthecae and typically bears a coating of iron and/or manganese compounds.

peduncle disease See COLD WATER DISEASE.

pefloxacin See QUINOLONE ANTIBIOTICS.

PEG POLYETHYLENE GLYCOL.

peitschengeissel flagellum See FLAGELLUM (b).

Pekilo process See SINGLE-CELL PROTEIN.

Pekin duck hepatitis B virus *Syn.* DUCK HEPATITIS B VIRUS.

pelagic May refer to that region of an aquatic habitat (e.g. lake, sea) comprising the entire body of water but excluding the BENTHIC zone, or may refer to organisms living in that region. (See also NEKTON; NEUSTON; PLANKTON.)

Pelagophycus See PHAEOPHYTA.

***Pelargonium* blackleg** See BLACKLEG (2).

med by CENTRIFUGATION. (2) A spherical colony formed by the growth of a mycelial fungus within a liquid medium.

pellicle (1) (*bacteriol., mycol.*) A continuous or fragmentary film, or a mat of organisms, formed at the surface of a liquid culture by certain bacteria or fungi.

A *bacterial* pellicle may comprise bacterial cells, extracellular products, or both. Strains of *Acetobacter xylinum* (see ACETOBACTER) form a tough pellicle of CELLULOSE; each cell produces a single cellulose ribbon composed of a number of microfibrils which apparently emanate from distinct sites along the outer membrane [Book ref. 38, pp. 526–528]. The cellulose ribbons from many cells aggregate to form a network which floats to the surface of the medium, carrying the cells with it — presumably a mechanism for maintaining the organisms in the upper, oxygenated regions of the medium.

Among *fungi*, pellicles are formed on liquid cultures e.g. by various yeasts (see e.g. 'flor' yeasts in WINE-MAKING) and by some mycelial fungi (e.g. *Penicillium* spp).

(2) (*mycol.*) Any superficial membranous structure which can easily be removed from the tissues beneath it.

(3) (*protozool.*) A composite membranous structure which forms the limiting envelope in many protozoa. In some flagellates (e.g. *Trypanosoma*) the pellicle consists essentially of the cytoplasmic membrane (= plasmalemma) supported from beneath by a system of microtubules; some authors do not regard such a simple type of cell envelope as a pellicle. (cf. EUGLENOID FLAGELLATES.) In coccidia (phylum APICOMPLEXA) the pellicle of the sporozoite and merozoite stages consists of three unit-type membranes, the outermost membrane (plasmalemma) enclosing the entire cell; the middle and inner membranes are closely apposed and together form the inner pellicular complex — a structure which underlies the plasmalemma (except at the MICROPORES and at regions delimited by the POLAR RINGS) and is separated from it by an electron-translucent layer ca. 15–20 nm thick. In the apicomplexan *Gregarina garnhami* the three-membrane-thick pellicle forms a series of longitudinal folds, the crests of which are associated with two sets of longitudinal filaments which have been postulated to have a role in gliding motility [JUR (1984) *88* 66–76].

The typical ciliate pellicle consists of three layers of unit-type membrane, the outermost of which (the plasmalemma) covers the entire organism, including the cilia. The two inner layers are sometimes called 'alveolar mem-

DORLAND'S ILLUSTRATED

Medical Dictionary

Twenty-fifth Edition
Asian Edition

W. B. SAUNDERS · Philadelphia · London · Toronto
IGAKU SHOIN LTD · Tokyo

PbS lead sulfide.

$PbSO_4$ lead sulfate.

PBZ pyribenzamine.

PC phosphocreatine; sometimes used to designate phosphatidyl choline, or palmitoyl carnitine.

P.C. abbreviation for L. *pon'dus civi'le*, avoirdupois weight.

p.c. abbreviation for L. *post ci'bum*, after meals.

pc. picocurie.

PCA passive cutaneous anaphylaxis; see under *anaphylaxis*.

PcB abbreviation for *near point of convergence to the intercentral base line*.

P.Cc. periscopic concave.

PCG phonocardiogram.

P.C.M.O. Principal Colonial Medical Officer.

PCO_2 symbol for *carbon dioxide partial pressure* or *tension*; also written $P_{(v)}$, pCO_2, and pCO_2.

Pcs. preconscious.

PCV packed cell volume; see under *volume*.

P.Cx. periscopic convex.

P.D. interpupillary distance.

Pd chemical symbol for *palladium*.

p.d. prism diopter; papilla diameter; pupillary distance.

peak (pēk) the top or upper limit of a graphic tracing or of any variable. **Bragg p. of proton beam,** the end of range of a beam of protons aimed from a cyclotron in nearly a straight line. **kilovolt p.,** the maximum amount of voltage that an x-ray machine is using; abbreviated kvp.

Péan's forceps, operation (pa-anz′) [Jules Émile *Péan*, French surgeon, 1830–1898] see under *operation*.

pearl (perl) 1. a small calcareous concretion from various species of mollusks, formerly regarded as having curative powers. 2. a small medicated granule, or a glass globule with a single dose of volatile medicine, as amyl nitrite. 3. a rounded mass of tough sputum as seen in the early stages of an attack of bronchial asthma. **Bohn's epithelial p's,** small retention cysts in the mouths of infants. **Elschnig's p's,** see under *body*. **enamel p.,** enameloma. **epidermic p's, epithelial p's,** rounded concentric masses of epithelial cells found in certain papillomas and epitheliomas; called also *pearly bodies*. **Epstein's p's,** small whitish-yellow masses on either side of the raphe of the hard palate of the newborn. **gouty p.,** a sodium urate concretion on the cartilage of the ear in gouty persons. **Laennec's p's,** soft casts of the smaller bronchial tubes expectorated in bronchial asthma.

pearlash (perl′ash) impure potassium carbonate in crystals.

peat (pēt) carbonized vegetable matter found in bogs; used in peat baths and as a dry absorbent dressing.

peau (po) [Fr.] skin. **p. d'orange** (po″do-rahnj′) [Fr. "orange skin"], a dimpled condition of the skin, resembling that of an orange.

pebble (peb′l) a kind of rock crystal from which lenses are sometimes cut.

pébrine (pa-brēn′) [Fr.] an infectious disease of silkworms caused by *Nosema bombycis*. Cf. *nosema disease*.

pecazine (pe′kah-zēn) mepazine.

peccant (pek′ant) [L. *peccans* sinning] unhealthy; causing illness or disease.

peccatiphobia (pek″kah-tĭ-fo′be-ah) [L. *peccata*, sins + *phobia*] morbid fear of sinning.

pechyagra (pek″e-a′grah) [Gr. *pēchys* forearm + *agra* seizure] gout of the elbow.

pecilo- for words beginning thus, see those beginning *poikilo-*.

Pecquet's cistern (reservoir), duct (pek-āz′) [Jean *Pecquet*, French anatomist, 1622–1674] see *cisterna chyli* and *ductus thoracicus*.

pectase (pek′tās) pectinesterase.

pecten (pek′ten), pl. *pec'tines* [L.] 1. a comb; applied to certain anatomical structures because of a fancied resemblance to a comb. 2. a name given by Stroud, in 1895, to a narrow zone in the anal canal, bounded above by the pectinate line and possessing a comparatively dense connective tissue matrix with thick muscular and elastic components. 3. a triangular pleated membrane in the eye of birds, extending forward from the optic disk, which it covers, for a variable distance into the vitreous body. **p. os'sis pu'bis** [NA], the anterior border of the superior ramus of the pubis, beginning at the pubic tubercle and continuing to the iliopubic eminence; called also *pectineal line*.

pectenine (pek′tĕ-nin) a poisonous alkaloidal compound from a Mexican cactus, *Cereus pecten*.

pectenitis (pek″tĕ-ni′tis) inflammation of the pecten of the anus.

pectenosis (pek″tĕ-no′sis) stenosis of the anal canal caused by a rigid, inelastic ring of tissue of variable width and thickness, between the anal groove and anal crypts, producing pain on defecation, bleeding, and anal irritation.

pectenotomy (pek″tĕ-not′o-me) [*pecten* + Gr. *tomē* a cutting] surgical correction of pectenosis by incision of the ring of tissue causing it.

pectic (pek′tik) relating to pectin.

pectin (pek′tin) [Gr. *pēktos* congealed] a homosaccharidic polymer of sugar acids of fruit that forms gels with sugar at the proper pH. A purified form obtained from the acid extract of the inner portion of the rind of citrus fruits or from apple pomace is used as a protectant and in cooking.

pectinase (pek′tĭ-nās) polygalacturonase.

pectinate (pek′tĭ-nāt) [L. *pecten* comb] shaped like a comb.

pectineal (pek-tin′e-al) [L. *pecten*, comb, pubes] pertaining to the os pubis.

pectinesterase (pek″tin-es′ter-ās) pectin pectyl-hydrolase: an enzyme that catalyzes the hydrolysis of methyl ester groups of pectic substances, releasing the free acid.

pectiniform (pek-tin′ĭ-form) [L. *pecten* comb + *forma* form] comb-shaped.

pectization (pek″ti-za′shun) [Gr. *pēktikos* curdling] coagulation or gelatinization; a term used in colloidal chemistry.

pectolytic (pek″to-lit′ik) [*pectin* + Gr. *lytikos* dissolving] capable of effecting the digestion of pectin.

pectoral (pek′to-ral) [L. *pectoralis*] 1. of, or pertaining to, the breast or chest. 2. relieving disorders of the respiratory tract, as an expectorant.

pectoralgia (pek″to-ral′je-ah) [L. *pectus* breast + *-algia*] pain in the breast or pectoral muscles.

pectoralis (pek″to-ra′lis) [L.] pertaining to the breast or chest.

pectoriloquy (pek″to-ril′o-kwe) [L. *pectus* breast + *loqui* to speak] transmission of the sound of spoken words through the chest wall. **aphonic p.,** the sound of the whispered voice transmitted through a serous, but not through a purulent, exudate within the pleura. **whispered p., whispering p.,** the transmission of the sound of whispered words through the walls of the chest.

pectorophony (pek″to-rof′o-ne) [L. *pectus* breast + Gr. *phōnē* voice] exaggeration of the vocal resonance heard on auscultation.

pectose (pek′tōs) a principle in unripe fruits and plants from which pectin is derived.

pectous (pek′tus) pertaining to, composed of, or resembling pectin; having a firm, jelly-like consistence.

pectunculus (pek-tung′ku-lus) [L., dim of *pecten* comb] any one of the series of small longitudinal ridges on the aqueduct of Sylvius.

pectus (pek′tus) [L.] the breast: the chest or thorax. **p. carina'tum** [L. "keeled breast"], undue prominence of the sternum; called also *chicken* or *pigeon breast*. **p. excava'tum** [L. "hollowed breast"], undue depression of the sternum; called also *funnel breast* or *chest*. **p. gallina'tum,** p. carinatum. **p. recurva'tum,** p. excavatum.

pedal (ped′al) [L. *pedalis; pes* foot] pertaining to the foot or feet.

THE
MERCK INDEX

AN ENCYCLOPEDIA OF
CHEMICALS, DRUGS, AND BIOLOGICALS

THIRTEENTH EDITION

Editorial Staff

Maryadele J. O'Neil, *Senior Editor*
Ann Smith, *Senior Associate Editor*
Patricia E. Heckelman, *Associate Editor*

John R. Obenchain Jr., *Editorial Assistant*
Jo Ann R. Gallipeau, *Technical Assistant*
Mary Ann D'Arecca, *Administrative Associate*

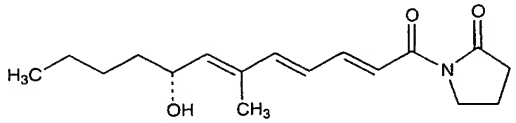
Susan Budavari, *Editor Emeritus*

Published by
Merck Research Laboratories
Division of

MERCK & CO., INC.
Whitehouse Station, NJ

2001

dl-form: A. Ishida, T. Mukaiyama, *Chem. Letters* **1977,** 467; *eidem, Bull. Chem. Soc. Japan* **51,** 2077 (1978).



Neutral oil with ester-like odor. Does not show definite boiling or dec pt. $[\alpha]_D^{28}$ −5.68° (methanol). Freely sol in methanol, ethanol, acetone, ethyl acetate, benzene, ether, chloroform, pyridine, dioxane, acetic acid; slightly sol in water, petr ether, ligroin. uv max (methanol): *ca.* 318, 324 nm ($E_{1cm}^{1\%}$ 1198). Unstable and gradually loses antifungal activity in desiccator, though it is fairly stable in organic solvents. Unstable under alkaline conditions.

Monohydrate. Needles from ethyl acetate + petr ether, mp 41.5-42.5°. uv max: 320 nm (ε 46,000).

THERAP CAT: Antifungal.

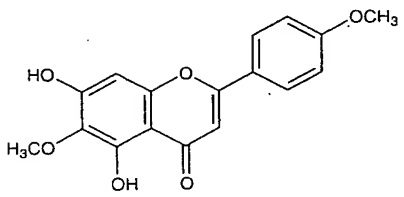
7135. Pectin. [9000-69-5] Polysaccharide substance present in cell walls of all plant tissues which functions as an intercellular cementing material. One of the richest sources of pectin is lemon or orange rind which contains about 30% of this polysaccharide. Occurs naturally as the partial methyl ester of α-(1 → 4) linked D-polygalacturonate sequences interrupted with (1 → 2)-L-rhamnose residues. Neutral sugars: D-galactose, L-arabinose, D-xylose and L-fucose form side chains on the pectin molecule. Structure studies: D. A. Rees, A. W. Wight, *J. Chem. Soc. B.* **1971,** 1366. Secondary and tertiary structure in solution and in gels: D. A. Rees, E. J. Welsh, *Angew. Chem. Int. Ed.* **16,** 214 (1977). Review and bibliography: Towle, Christensen, in *Industrial Gums,* R. L. Whistler, Ed. (Academic Press, New York, 2nd ed., 1973) p 429-461. Book: Z. I. Kertesz, *The Pectic Substances* (Interscience, New York, 1951).

Occurs as a coarse or fine powder, yellowish-white in color, practically odorless, and with a mucilaginous taste. Almost completely sol in 20 parts water, forming a viscous soln contg negatively charged, very much hydrated particles. Acid to litmus. Insol in alcohol or in diluted alcohol, and in other organic solvents. Dissolves more readily in water, if first moistened with alcohol, glycerol or sugar syrup, or if first mixed with 3 or more parts of sucrose. Stable under mildly acidic conditions; more strongly acidic or basic conditions cause depolymerization.

USE: In the preparation of jellies and similar food products: Owens *et al.*, "Factors Influencing Gelation with Pectin" in Advances in Chemistry Series, *Natural Plant Hydrocolloids* (A.C.S., Washington, 1954) pp 10-15.

THERAP CAT (VET): Antidiarrheal.

7136. Pectolinarigenin. [520-12-7] 5,7-Dihydroxy-6-methoxy-2-(4-methoxyphenyl)-4*H*-1-benzopyran-4-one; 5,7-dihydroxy-4′,6-dimethoxyflavone; 6-methoxyacacetin; 6-hydroxypelargidenon-6,4′-dimethyl ether 1467. $C_{17}H_{14}O_6$; mol wt 314.29. C 64.97%, H 4.49%, O 30.54%. From leaves of *Linaria vulgaris* Mill., *Scrophulariaceae:* Schmid, Rumpel, *Monatsh.* **57,** 421 (1931); Merz, Wu, *Arch. Pharm.* **274,** 126 (1936). Structure: Schmid, Rumpel, *Monatsh.* **60,** 8 (1932). Synthesis: Wessely, Moser, *ibid.* **56,** 97 (1930); Zemplén, Farkas, *Ber.* **76,** 937 (1943); Murti, Seshadri, *Proc. Indian Acad. Sci.* **30A,** 78 (1949), *C.A.* **44,** 3987d (1950); Farkas, Strelisky, *Tetrahedron Letters* **1970,** 187.

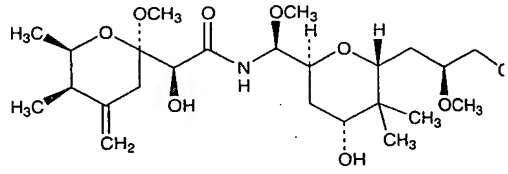


Yellow needles from methanol, mp 220-223°. uv max (methanol): 275, 335 nm. Sol in alcohol, acetone, ether, ethyl acetate. Practically insol in water, benzene, chloroform, petr ether.

Diacetate. $C_{21}H_{18}O_8$. Needles from 96% alcohol, r

7-Rutinoside. Pectolinarin; neolinarin. $C_{29}H_{34}O_{15}$ leaves of *L. vulgaris* Mill., *Scrophulariaceae:* Klobb, *Rend.* **145,** 331 (1907); Zemplén *et al., Ber.* **75,** 489 from *Cirsium oleraceum* Scop., *Compositae:* Wagne *Arch. Pharm.* **293,** 1053 (1960). Structure: Zemplén, *Ber.* **74,** 1818 (1941). Yellow crystals from methanol, r uv max (methanol): 275, 330 nm (log ε 4.256, 4.365).

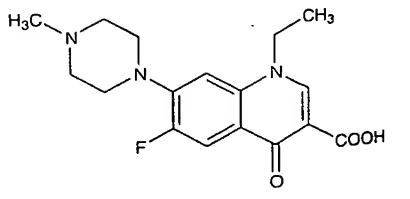
7137. Pederin. [27973-72-4] (1*S*)-2,6-Anhydro-3-deoxy-1-*C*-[[(2*S*)-hydroxy[(2*R*,5*R*,6*R*)-tetrahydro-2-m 5,6-dimethyl-4-methylene-2*H*-pyran-2-yl]acetyl]amino methyl-1,8,9-tri-*O*-methyl-D-*manno*-nonitol; *N*-[[6-(2 thoxypropyl)tetrahydro-4-hydroxy-5,5-dimethyl-2*H*-p yl]methoxymethyl]tetrahydro-2-methoxy-5,6-dimethyl ylene-2*H*-pyran-2-glycolamide; pederine; paederine. NO_9; mol wt 503.62. C 59.62%, H 9.01%, N 2.78%, O The toxic principle isolated from blister beetles, *Paed cipes* Curt.: Pavan, Bo, *Physiol. Comparata et Oecol* (1953), *C.A.* **48,** 10217g (1954); **GB 932875** (1963 t talia). Powerful inhibitor of protein biosynthesis and Structure: Cardani *et al., Gazz. Chim. Ital.* **96,** 3 (19 vised structure: Matsumoto *et al., Tetrahedron Lette* 6297. Biosynthesis: Cardani *et al., ibid.* **1973,** 2815. T thesis: F. Matsuda *et al., Tetrahedron Letters* **23,** 404 **24,** 1277 (1983).



Crystals from hexane, benzene + hexane, ether + mp 112-112.5°. Slightly sol in water, hexane. Sol in m ethanol, carbon disulfide, chloroform, carbon tetrachlor zene, and acids. Practically insol in petr ether, NH_4OH

Pseudopederin. [10352-73-5] *N*-[[6-(2,3-Dimeth pyl)tetrahydro-4-hydroxy-5,5-dimethyl-2*H*-pyran-2 thoxymethyl]tetrahydro-α,2-dihydroxy-5,6-dimethyl-4 lene-2*H*-pyran-2-acetamide; ψ-paederine: ψ-pederine; paederine. $C_{24}H_{43}NO_9$; mol wt 489.60. Isoln from bli tles, *Paederus fuscipes:* Quilico *et al., Chem. Ind. (M* 1434 (1961), *cf.* Cardani *et al., Tetrahedron Letters* **19** **GB 932875** (1963 to Farmitalia). Crystals from ben 133°.

7138. Pefloxacin. [70458-92-3] 1-Ethyl-6-fluor hydro-7-(4-methyl-1-piperazinyl)-4-oxo-3-quinolinec acid; pefloxacine; EU-5306; 1589RB; AM-725. $C_{17}H_2$ mol wt 333.36. C 61.25%, H 6.05%, F 5.70%, N 12 14.40%. Fluorinated quinolone antibacterial; analog of acin, *q.v.* Prepn: M. Pesson, **DE 2840910**; *idem,* **US** (1979, 1981 to Roger Bellon/Dainippon). Pharmaco antibacterial spectrum: Y. Goueffon *et al., Compt. R. III* **292,** 37 (1981). Pharmacokinetics: J. Barre *et al., J Sci.* **73,** 1379 (1984). Bioavailability and metabolism: trepois *et al., J. Antimicrob. Chemother.* **14,** 51 (1984); tay *et al., Antimicrob. Ag. Chemother.* **25,** 463 (1984 determn in urine and plasma: *eidem, J. Chromatog.* (1983). Symposium on pharmacokinetics, clinical effi safety: *J. Antimicrob. Chemother.* **26,** Suppl. B, 1-22



The Condensed Chemical Dictionary

EIGHTH EDITION

Revised by

GESSNER G. HAWLEY
Formerly Executive Editor, Reinhold Publishing Corporation
Coeditor, Encyclopedia of Chemistry

VNR VAN NOSTRAND REINHOLD COMPANY
NEW YORK CINCINNATI TORONTO LONDON MELBOURNE

copper, copper alloys, including bronzes, and also sometimes of iron and other metals. Such a film is formed by exposure to the air, or by a suitable chemical treatment.

patronite. A mixture of vanadium-bearing substances with the approximate formula VS_4, found in Peru.

Pattinson process. Process for the removal of silver from lead. The silver-lead mixture is melted in one of a series of pots and allowed to cool slowly. The lead which is free from silver or poorer in silver separates out as crystals which are removed, leaving the silver-rich lead in the molten state. From a number of such operations in series a lead rich in silver is obtained, collected, and the silver recovered. See also Parkes process.

"Paveril Phosphate."[100] Trademark for dioxyline phosphate (q.v.).

Pb Symbol for lead.

PBAA. Abbreviation for polybutadieneacrylic acid copolymer.

PBD. See 1,3,4-phenylbiphenylyloxadiazole.

PBI. See polybenzimidazole.

PBPB. Abbreviation for pyridinium bromide perbromide.

PCB. Abbreviation for polychlorinated biphenyl.

"PC-1244" Defoamer.[58] Trademark for a clear light yellow liquid; sp. gr. at 60/60°F, 0.86; 7.72 lb/gal. Used as a foam control in non-aqueous systems and also imparts a leveling action in paraffin wax formulations.

P.C.E. Abbreviation for pyrometric cone equivalent, a scale of melting or fusion points of refractory materials, based on comparison with the temperature at which pyrometric cones (q.v.) melt.

P-cellulose. See phosphorylated cellulose.

PCNB. Abbreviation for pentachloronitrobenzene (q.v.).

"PCON."[233] Trademark for 4-chloro-2-nitroaniline (q.v.).

PCP. Abbreviation for pentachlorophenol (q.v.).

PCTFE. Abbreviation for polychlorotrifluoroethylene. See chlorortrifluoroethylene resin.

pcu. Abbreviation for pound centigrade unit, the amount of heat needed to raise one pound of water from 15 to 16°C. See also chu.

Pd Symbol for palladium.

PDB. Abbreviation for para-dichlorobenzene (q.v.).

PE. Abbreviation for pentaerythritol and for polyethylene.

"PE-100."[210] Trademark for a cationic polyelectrolyte containing a quaternary ammonium group. Used as a conductive coating, coagulant aid, and metal complexing agent.

peacock blue. A blue organic pigment used especially in inks for multicolor printing. It is a lake of acid glaucine blue dye on alumina hydrate. Structurally, the dye is alpha, alpha-bis[N-ethyl-N-(4-sulfobenzyl)aminophenyl]-alpha-hydroxy-ortho-toluenesulfonic acid sodium salt, $HSO\ C_6H_4COH[C_6H_4N(C_2H_5)CH_2C_6H_4SO_3Na]_2$, and is prepared from aniline, ethanol, benzyl chloride, ortho-chlorobenzaldehyde, sulfuric acid, and sodium bisulfite.

Containers: 250-lb barrels.

Note: The term peacock blue is sometimes applied to other pigments of similar color, such as Prussian blue which has been treated with phosphotungstic acid.

peanut cake. The press cake resulting from the extraction of oil from the peanut. See peanut oil meal.

peanut oil (arachis oil; groundnut oil). A fixed nondrying oil.

Properties: Yellow to greenish yellow. Soluble in ether, petroleum ether, carbon disulfide and chloroform; insoluble in alkalies, but saponified by alkali hydroxides with formation of soaps; insoluble in water; slightly soluble in alcohol. Sp. gr. 0.912-0.920 (25°C); solidifying point −5 to +3°C; saponification value 186-194; iodine number 88-98; refractive index 1.4625-1.4645 (40°C). Flash point 540°F. Combustible. Nontoxic. Autoignition temp. 883°F.

Chief known constituents: Principally glycerides of oleic and linoleic acids, with lesser amounts of the glycerides of palmitic, stearic, arachidic, behenic, and lignoceric acids.

Derivation: By pressing ground peanut meats or by extraction with hot or cold solvents.

Method of purification: Bleaching with fuller's earth or carbon. Hot-pressed oil is frequently allowed to stand to deposit stearin (which it will do even at ordinary temperatures) and then filtered.

Grades: U.S.P., crude; refined; edible.

Containers: 5-gal tins; 50-gal drums; tank cars.

Uses: Substitute for olive oil; edible oils, both hydrogenated and unhydrogenated; soaps; vehicle for medicines; salad oil; mayonnaise; margarine.

peanut oil meal. The crushed form of peanut cake resulting from the extraction of oil from the seed. Prepared with or without the shells; the oil meal of commerce contains between 39-45% crude protein and is sold on that basis. Typical analysis of 39% protein meal: 39.1% crude protein; 5.3% crude fiber; 34.3% nitrogen-free extract; 6.2% ether-soluble (fats); 5.3% ash; total digestible nutrient approximately 80%.

Containers: Bulk or bags.

Uses: Animal feeds; fertilizer ingredient.

pearl alum. See aluminum sulfate.

pearl ash. See potassium carbonate.

"Pearlescent Pigment."[304] Trademark for a lead monohydrogen phosphate.

pearl essence. See nacreous pigment.

pearl pigment. See nacreous pigment.

pearl white. See bismuth oxychloride; bismuth subnitrate.

pear oil. See amyl acetate.

peat. Partly decayed vegetable matter which has accumulated in marshes. Essentially the first stage in the development of lignite.

pectin. A high molecular weight substance (polyuronide) related to carbohydrates and found in varying quantities in fruits and plants. Pectin consists chiefly

of partially methoxylated galacturonic acids joined in long chains.
Properties: White powder or syrupy concentrates. Commonest characteristic of pectins is their property of jelling at room temperature, after addition of sugar to fruit juices in the preparation of jams or jellies. Soluble in water; insoluble in organic solvents. Nontoxic.
Derivation: By dilute-acid extraction of the inner portion of the rind of citrus fruits, or of fruit pomaces, usually apple.
Method of purification: Following decolorization, the extracts are concentrated by evaporation or the pectins precipitated with alcohol or acetone.
Grades: Pure (N.F.) containing not less than 6.7% methoxy groups and not less than 74% galacturonic acid; 150-, 200-, 250-jelly grades, containing various diluents.
Uses: Jellies, foods, cosmetics, drugs; protective colloids; emulsifying agents; dehydrating agents.

pectin sugar. See L-arabinose.

pectic acid. An acid derived from pectin by treating it with sodium hydroxide solution, washing with isopropyl alcohol, adding alcoholic hydrogen chloride and finally washing again with isopropyl alcohol and drying. Acidulant in pharmaceuticals.

pectinase. An enzyme present in most plants. It catalyzes the hydrolysis of pectin to sugar and galacturonic acid.
Use: Biochemical research; juice and jelly industry.

"Pectinol."[23] Trademark for formulated enzyme concentrates, of fungal origin, with varying degrees of pectinase activity which hydrolyze pectic substances.
Uses: Clarification of wines and fruit juices and processing of jellies.

"Peerless."[133] Trademark for standard "flow" black for the printing ink, carbon paper, and typewriter ribbon industries. Available in four types: "Standard Peerless," "Peerless Mark II," "Peerless Mark IIA," and "Peerless Beads."

"Pee Vee Cee."[41] Trademark for type II polyvinyl chloride sheet material.

PEG. Abbreviation for polyethylene glycol (q.v.).

"Pegosperse."[73] Trademark for a series of polyglycol esters of fatty acids. Typical examples:
100 ML. Diethylene glycol monolaurate.
100 O. Diethylene glycol oleate.
50 MS. Ethylene glycol monostearate.
PS. Propylene glycol stearate.
"PGMS 64." Propylene glycol monostearate.
Uses: Plasticizers; softeners; wetting agents; detergents; lubricants; emulsifying agents.

"Peladow."[233] Trademark for calcium chloride, 94-97%, available as white, deliquescent pellets.

"Pelargol."[188] Trademark for a perfume base for soap perfumes of the geranium and rose types.

pelargonic acid (n-nonoic acid; n-nonanoic acid; n-nonylic acid) $CH_3(CH_2)_7COOH$.
Properties: Colorless or yellowish oil with slight odor; sp. gr. 0.9052 (20/4°C); m.p. 12.5°C; b.p. 255.6°C, 162.4°C (32 mm); refractive index 1.4322 (20°C); soluble in alcohol, ether, and organic solvents; almost insoluble in water. Combustible. Low toxicity.
Derivation: By the oxidation of nonyl alcohol or nonyl aldehyde; the oxidation of oleic acid, especially by ozone.
Grades: Technical; 99%.
Containers: Drums; tank cars.
Hazard: May be skin irritant.
Uses: Organic synthesis; lacquers; plastics; production of hydrotropic salts; pharmaceuticals; synthetic flavors and odors; flotation agent; esters for turbojet lubricants; vinyl plasticizer; gasoline additive.
See also nonoic acid.

pelargonic alcohol. See nonyl alcohol.

pelargonic aldehyde. See nonanal.

pelargonyl chloride (n-nonanoyl chloride) $CH_3(CH_2)_7COCl$.
Properties: B.p. 80-85°C (5 mm); min assay 97%; soluble in hydrocarbons and ethers; decomposes in water.
Containers: Bottles, carboys, drums.
Hazard: May be skin irritant.
Use: Intermediate in organic synthesis.

pelargonyl peroxide $(C_8H_{17}COO—)_2$.
Properties: Water-white liquid with a faint odor; sp. gr. 0.926 min (25/25°C); m.p. 10°C; refractive index 1.443 min (25°C). Insoluble in water and glycerol; soluble in alcohol and hydrocarbons.
Hazard: Strong skin irritant and oxidizing agent. Dangerous fire risk in contact with organic materials.
Use: Initiator of polymerization reactions.
Shipping regulations: (ICC, CG) Yellow label. (IATA) Not acceptable.

"Pelaspan."[233] Trademark for a series of expandable polystyrenes in bead or pellet form. Each bead contains its own expanding agent, which is activated by heat.

Peligot's salt. See potassium chlorochromate.

"Pelletex."[275] Trademark for pelleted gas furnace carbon black for rubber.

pelletierine $C_5H_{10}N(CH_2)_2CHO$. beta-2(-Piperidyl) propionaldehyde.
Properties: Liquid alkaloid from the root of the pomegranate. Soluble in water, alcohol, ether, chloroform, benzene. Sp. gr. 20/4°C 0.988; b.p. 195°C.
Hazard: Probably toxic.
Use: Medicine (in form of its salts, sulfate, tannate, valerate).

"Pelletol" No. 1.[28] Trademark for a free-running non-nitroglycerin, completely waterproof explosive.

"Peltex."[476] Trademark for a ferrochrome complex of sodium lignosulfonate; used as a specialized dispersant in oil well drilling fluids.

"Pemco."[296] Trademark for ceramic frits and coloring oxides.

"Penacolite" Adhesives.[11] Trademark for resorcinol-formaldehyde and resorcinol-phenol-formaldehyde adhesives and thermosetting resins in a variety of formulations.
Uses: Bonding of wood and cellulosic products, some thermosetting and thermoplastic resins and plastics, natural and some synthetic rubbers.

"Penbro."[79] Trademark for B wood resin.
Uses: Adhesives; animal depilatories; asphalt emulsions; paper size; cleaning compounds (electroplating).

"Penchlor."[204] Trademark for cold setting silicate-type acid-resistant cements. Completely stable in dry storage.
Grades: Acid-Proof, S-25, Fireproof, and FCC.